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Revision of the Garnieriinae (Gastropoda: Stylommatophora: Clausiliidae), with Descriptions of New Taxa

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With 12 figures and 1 table

Summary

The subfamily Garnieriinae of the family Clausiliidae which is distributed with 21 known species in South East Asia is systematically revised. The following taxa are described as new: Tropidaucheniini **n. trib.**, *Tropidauchenia* (*Neniauchenia*) **n. subgen.**, *Garnieria saurini* **n. sp.**, *Tropidauchenia* (*Neniauchenia*) *amoena* **n. sp.**, *T.* (*Grandinenia*) *cinderella* **n. sp.**, *T.* (*Indonenia*) *excellens* **n. sp.**, *T.* (*T.*) *donggiaoensis* **n. sp.**, *T.* (*T.*) *fischeri* **n. sp.**, *Garnieria mouhoti moellendorffi* **n. ssp.**, *Tropidauchenia* (*Neniauchenia*) *dautzenbergi decollata* **n. ssp.**, *T.* (*T.*) *fischeri reticulata* **n. ssp.**, *T.* (*T.*) *giardi brunnea* **n. ssp.**, *T.* (*T.*) *giardi citrina* **n. ssp.**

Keywords: Gastropoda, Clausiliidae, Garnieriinae, *Garnieria*, *Tropidauchenia*, new tribe, new subgenus, new species, South East Asia.

Zusammenfassung

Die Unterfamilie Garnieriinae der Familie Clausiliidae, die mit 21 bekannten Arten in Südostasien verbreitet ist, wird systematisch revidiert. Die folgenden Taxa werden neu beschrieben: Tropidaucheniini **n. trib.**, *Tropidauchenia* (*Neniauchenia*) **n. subgen.**, *Garnieria saurini* **n. sp.**, *Tropidauchenia* (*Neniauchenia*) *amoena* **n. sp.**, *T.* (*Grandinenia*) *cinderella* **n. sp.**, *T.* (*Indonenia*) *excellens* **n. sp.**, *T.* (*T.*) *donggiaoensis* **n. sp.**, *T.* (*T.*) *fischeri* **n. sp.**, *Garnieria mouhoti moellendorffi* **n. ssp.**, *Tropidauchenia* (*Neniauchenia*) *dautzenbergi decollata* **n. ssp.**, *T.* (*T.*) *fischeri reticulata* **n. ssp.**, *T.* (*T.*) *giardi brunnea* **n. ssp.**, *T.* (*T.*) *giardi citrina* **n. ssp.**

Schlüsselwörter: Gastropoda, Clausiliidae, Garnieriinae, *Garnieria*, *Tropidauchenia*, neue Tribus, neue Untergattung, neue Arten, Südostasien.

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1. Introduction

The subfamily Garnieriinae C. Boettger, 1926 comprises 21 known species (with 28 subspecies, including the newly described ones) which are distributed in tropical South East Asia (Burma, Indochina, South China). It has not been revised for more than 70 years, when EHRMANN (1927: 33–36) gave a short systematic account treating nearly only with the Tonkinese members of the group. The detection of some new species and subspecies, mainly in the collection of the Muséum National d'Histoire naturelle Paris, made this revision necessary. It is part of the project „Worldwide Clausiliidae" which has been carried out by the author since 1996. Only shell characters could be used for the revision, because until now not more than three species have been anatomically examined (cf. NORDSIECK 1999a: 24).

2. Materials and methods

The shell characters which are used for the classification of the Garnieriinae have been defined and discussed in former papers (NORDSIECK 1978: 70–73, 1982: 28–31). The methods of shell examination are described in recent papers (NORDSIECK 1998: 23–24, 2001: 27). The types and (or) original material of nearly all described species taxa of the Garnieriinae (21 of 25) were studied.

The *abbreviations* used for the collections of the respective institutions are as follows:
BM(NH) = The Natural History Museum, London;
IZPAN = Institute of Zoology of the Polish Academy of Sciences, Warszawa;
MCZ = Museum of Comparative Zoology, Cambridge;
MNHN = Muséum National d'Histoire naturelle, Paris;
NMW = Naturhistorisches Museum, Wien;
NNM = Nationaal Natuurhistorisch Museum, Leiden;
SMF = Senckenberg-Museum, Frankfurt a. M.;
UF = Florida State Museum, Gainesville.

The *abbreviations* used for the measurements are: H = shell height, W = shell width, HA = aperture height, WA = aperture width, R_2 = rib number per 2 mm of the penultimate whorl.

3. Diagnosis, distribution, systematic position

The subfamily Garnieriinae is defined as follows: Shell semiapostrophic or apostrophic (for the definition of apostrophy see NORDSIECK 1978: 71–72, note 2, fig. 1–3); neck nearly rounded (keels relatively weak or absent); lamellae in the interior crowded together towards the columella, inferior lamella penetrating more deeply than spiral lamella; lunellar of lunella type. The subcolumellar lamella does not shift to the palatal side, but remains near to the columella (essential shell difference to the Neniinae Wenz, 1923, cf. NORDSIECK 1999b: 168).

Further shell characters are: Most species relatively large and streaked; lunellar (if complete) consisting of upper palatal plica, lunella and lower palatal plica, only posterior upper palatal plica present (except occasionally in *Garnieria*), both parts of the lower palatal plica present or more or less reduced; clausilium plate mostly normal (tongue-shaped).

The genital characters of the subfamily are the following (cf. NORDSIECK 1978: 80, 1999a: 24, only three species of *Tropidauchenia* examined): Terminal part of the bursa copulatrix not bent off from the spermoviduct, diverticulum normally developed or transitional to a glandular tube (in one species missing); male end ducts normally developed, penis of normal length (not longer than the female end ducts); penial coecum present (in one species reduced); penial retractor not subdivided, only penial branch developed; epiphallus not much shorter than penis. The essential difference to all other subfamilies is the insertion of the penial retractor only on the penis.

The species of the subfamily are distributed in South East Asia from Burma to South China (Burma; Laos; Vietnam: Tonkin, Annam; South China: Guangxi, Hainan). Yet unknown species may occur also in other countries of the region (e. g. Thailand). The evolution centre may be Laos, because in this country the highest diversity is observed. However, it must be stated that the knowledge of the subfamily is quite insufficient.

The systematic position of the subfamily is discussed as follows: The shell character apostrophy is correlated with the described characters of the inner lamellae and the lunella type of lunellar. This whole character complex is regarded as apomorphic (for the lunella type see NORDSIECK 1982: 38; apostrophy is regarded as apomorphic, because the majority of clausiliids have a non-apostrophic shell). The genital character insertion of the penial retractor only on the penis is also regarded as apomorphic (the plesiomorphic condition is the insertion on epiphallus and penis, cf. NORDSIECK 1994: 6–7). The shell apomorphy was probably evolved in parallel in two other non-related subfamilies (arguments see NORDSIECK 1978: 77–78, 1999a: 23, 1999b: 168), the genital apomorphy is unique. Thus until now no probable synapomorphies with other subfamilies were found, and the systematic position of the subfamily is unclear.

4. Characters, system and species list

4.1. Characters

The shell characters or character complexes used for this revision are the following (Tab. 1): Decollation; streaking; sculpture; aperture formation; neck formation; relation of superior lamella and spiral lamella; position of inferior lamella; develop-

Table 1. Characters of the Garnieriinae examined. – Characters: ***1*** = Decollation: 0 = entire, 1 = decollated. – ***2*** = Streaking: 0 = not streaked, 1 = streaked. – ***3*** = Sculpture: 0 = simple (only rib-striae or ribs), 1 = with spiral sculpture, 2 = with ridges. – ***4*** = Aperture formation: 0 = semiapostrophic, 1 = apostrophic. – ***5*** = Neck formation: 0 = neck rounded (both keels indistinct), 1 = basal keel present, 2 = dorsal keel present. – ***6*** = Relation of superior lamella and spiral lamella: 0 = superior lamella continuous with spiral lamella, 1 = separated from spiral lamella, lamella inserta present. – ***7*** = Position of inferior lamella: 0 = inferior lamella distant from superior and spiral lamella, 1 = near to superior and spiral lamella, 2 = fused with superior lamella. – ***8*** = Development of subcolumellar lamella: 0 = subcolumellar lamella emerging, in an oblique view in the aperture not visible far inwards, 1 = emerging, visible far inwards, 2 = immersed, visible far inwards. – ***9*** = Position of lunellar: 0 = lunellar dorsally or dorsolaterally situated, 1 = laterally situated. – ***10*** = Development of lower palatal plicae: 0 = both lower palatal plicae present, posterior lower palatal plica continuing anterior one, 1 = anterior lower palatal plica rudimentary or absent, posterior one continuing lunella, 2 = anterior lower palatal plica absent, posterior one indistinct or absent. – ***11*** = Width of clausilium plate (in *Garnieria* only the normally developed part of the clausilium plate considered): 0 = clausilium plate of normal width (relatively narrow), 1 = broad. – ***12*** = Correlated development of inferior lamella and clausilium plate: 0 = inferior lamella and clausilium plate normally developed, 1 = transformed (inferior lamella turned up, clausilium plate creased at the palatal side looking like doubled on itself and extended up to the inferior lamella).

Characters	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Garnieria	01	1	1	0	01	1	0	0	01	1	0	1
Tropidauchenia (*Neniauchenia*)	01	0	02	1	01	0	0	0	01	0	0	0
Tropidauchenia (*Indonenia*)	0	1	0	1	0	0	1	1	0	1	1	0
Tropidauchenia (*Grandinenia*)	01	01	012	1	01	0	01	1	0	12	0	0
Tropidauchenia (*Tropidauchenia*)	01	01	01	1	02	0	12	12	01	12	01	0

ment of subcolumellar lamella; position of lunellar; development of lower palatal plicae; width of clausilium plate; correlated development of inferior lamella and clausilium plate.

Only seven of the characters in Tab. 1 (***4***, ***6***, ***7***, ***8***, ***10***, ***11***, ***12***) are of taxonomic importance. The other ones are uninformative, because both or several character states occur in one and the same group in closely related species (states of character ***1*** occasionally even in one and the same species) and thus reveal frequent parallel evolution. The characters ***7*** (position of inferior lamella) and ***8*** (development of subcolumellar lamella) are in part correlated (the nearer the inferior lamella to superior and spiral lamella the better visible the subcolumellar lamella inwards) so that they should be regarded as one character complex.

4.2. System

Type species of genus taxa are spaced.

Clausiliidae Gray, 1855

Garnieriinae C. Boettger, 1926

Garnieriini C. Boettger, 1926

Garnieria Bourguignat, 1877
mouhoti (L. Pfeiffer, 1862) (*m. mouhoti*, *m. moellendorffi* **n. ssp.**); *saurini* **n. sp.**

Tropidaucheniini **n. trib.**

Tropidauchenia Lindholm, 1924 (note **1**)

Tropidauchenia (*Neniauchenia*) **n. subgen.**
amoena **n. sp.**; *dautzenbergi* (Morlet, 1892) (*d. dautzenbergi*, *d. decollata* **n. ssp.**); *rugifera* (Möllendorff, 1898)

Tropidauchenia (*Indonenia*) Ehrmann, 1927
excellens **n. sp.**; *masoni* (Theobald, 1864); *tuba* (Hanley, 1868)

Tropidauchenia (*Grandinenia*) Minato & Chen, 1984 (note **2**)
ardouiniana (Heude, 1885) [= *sajoi* (Szekeres, 1969) (note **3**)]; *cinderella* **n. sp.**; *fuchsi* (Gredler, 1883); *mirifica* (Chen & Gao, 1982); *schomburgi* (Schmacker & Boettger, 1890)

Tropidauchenia (*T.*) (*Symptychia* Ehrmann, 1927, note **4**)
bavayi (Lindholm, 1924); *demangei* (Bavay & Dautzenberg, 1909); *donggiaoensis* **n. sp.**; *dorri* (Bavay & Dautzenberg, 1899); *fischeri* **n. sp.** (*f. fischeri* **n. ssp.**, *f. reticulata* **n. ssp.**); *giardi* (H. Fischer, 1898) (*g. brunnea* **n. ssp.**, *g. citrina* **n. ssp.**, *g. giardi*); *orientalis* (Mabille, 1887) [*o. messageri* (Bavay & Dautzenberg, 1899) (note **5**), *o.orientalis*]; *proctostoma* (Mabille, 1889) (*p. forceps* Loosjes & Loosjes-van Bemmel, 1973, *p. proctostoma*).

4.3. Alphabetical list of species taxa

Examined type or original material and type locality in original spelling are given in *brackets*. Specimens of the collection of the Journal de Conchyliologie which are designated as „holotypes" or „types" by Fischer-Piette (1950) are evaluated as lectotypes.

ardouiniana Heude, 1885, *Clausilia* = *Tropidauchenia* (*Grandinenia*) *ardouiniana* (Heude, 1885) (syntypes MCZ 167092, Vietnam: sinus Tonquini = Baie d'Along);

ardouiniana var. *minor* Dautzenberg & Fischer, 1905, *Clausilia* [non Rossmässler, 1836] = *Tropidauchenia* (*Grandinenia*) *ardouiniana* (Heude, 1885) (syntype MNHN, Vietnam: Île Krieu);

bavayi Lindholm, 1924, *C.* [*Garnieria* (*Tropidauchenia*)] = *Tropidauchenia* (*T.*) *bavayi* (Lindholm, 1924), nom. nov. for *Clausilia* (*Pseudonenia*) *dorri* var. δ. *cristata* Bavay & Dautzenberg, 1899 (see below);

dautzenbergi Morlet, 1892, *Clausilia* = *Tropidauchenia* (*Neniauchenia*) *dautzenbergi* (Morlet, 1892) (lectotype MNHN, Laos: Kham-Keute);

demangei Bavay & Dautzenberg, 1909, *Clausilia* (*Pseudonenia*) = *Tropidauchenia* (*T.*) *demangei* (Bavay & Dautzenberg, 1909) (lectotype MNHN, Vietnam: Than-Hoa (= Phu-Quang));

dorri Bavay & Dautzenberg, 1899, *Clausilia* (*Pseudonenia*) = *Tropidauchenia* (*T.*) *dorri* (Bavay & Dautzenberg, 1899) (lectotype MNHN, Vietnam: surroundings of Ba-Bé lakes);

dorri var. β. *elongata* Bavay & Dautzenberg, 1899, *Clausilia* (*Pseudonenia*) [non Cantraine,

1835] = *Tropidauchenia* (*T.*) *dorri* (Bavay & Dautzenberg, 1899) (lectotype MNHN, Vietnam: surroundings of Ba-Bé lakes);
dorri var. γ. *minor* Bavay & Dautzenberg, 1899, *Clausilia* (*Pseudonenia*) [non Rossmässler, 1836] = *Tropidauchenia* (*T.*) *giardi brunnea* **n. ssp.** (lectotype MNHN, Vietnam: surroundings of Ba-Bé lakes);
dorri var. δ. *cristata* Bavay & Dautzenberg, 1899, *Clausilia* (*Pseudonenia*) [non Rossmässler, 1836] = *Tropidauchenia* (*T.*) *bavayi* (Lindholm, 1924) (lectotype MNHN, Vietnam: surroundings of Ba-Bé lakes);
forceps Loosjes & Loosjes-van Bemmel, 1973, *Tropidauchenia proctostoma* = *Tropidauchenia* (*T.*) *proctostoma forceps* (Loosjes & Loosjes-van Bemmel, 1973) (holotype IZPAN, Vietnam: Qui-Phûóng);
fuchsi Gredler, 1883, *Clausilia* (*Garnieria*) = *Tropidauchenia* (*Grandinenia*) *fuchsi* (Gredler, 1883) (original material SMF 32023–32025, 42241, South China: Kuang-si);
kaspari Gredler, 1883, *Clausilia* (*Garnieria*) *fuchsi* var. = *Tropidauchenia* (*Grandinenia*) *fuchsi* (Gredler, 1883) (no type or original material examined);
giardi H. Fischer, 1898, *Clausilia* = *Tropidauchenia* (*T.*) *giardi giardi* (H. Fischer, 1898) (syntype MNHN, Vietnam: Déo-Ma-Phuc);
goliath Rolle, 1910, *Garnieria* = *Tropidauchenia* (*T.*) *proctostoma proctostoma* (Mabille, 1889) (lectotype SMF 32010, Vietnam: between Phu-ly and Ké-So);
horrida Mabille, 1887, *Nenia* = *Tropidauchenia* (*Grandinenia*) *ardouiniana* (Heude, 1885) (no type or original material examined);
masoni Theobald, 1864, *Clausilia* = *Tropidauchenia* (*Indonenia*) *masoni* (Theobald, 1864) (syntypes BM(NH) 88.12.4.1034–6, Burma: Tonghoo);
massiei Morlet, 1892, *Clausilia* (*Phaedusa*?) = *Garnieria mouhoti* (L. Pfeiffer, 1862) (lectotype MNHN, Laos: Luang-Prabang);
messageri Bavay & Dautzenberg, 1899, *Clausilia* (*Pseudonenia*) = *Tropidauchenia* (*T.*) *orientalis messageri* (Bavay & Dautzenberg, 1899) (lectotype MNHN, Vietnam: between Lang-Son and That-Khé);
mirifica Chen & Gao, 1982, *Steatonenia* = *Tropidauchenia* (*Grandinenia*) *mirifica* (Chen & Gao, 1982) (paratypes SMF 319709, South China: Guangxi, Gui county);
mouhoti L. Pfeiffer, 1862, *Clausilia* = *Garnieria mouhoti* (L. Pfeiffer, 1862) (lectotype BM(NH) 20010206, "Lao mountains");
orientalis Mabille, 1887, *Nenia* = *Tropidauchenia* (*T.*) *orientalis orientalis* (Mabille, 1887) (syntypes MNHN, Vietnam: Tonkin);
proctostoma Mabille, 1889, *Nenia* = *Tropidauchenia* (*T.*) *proctostoma proctostoma* (Mabille, 1889) (syntypes MNHN, Vietnam: Tonkin);
rugifera Möllendorff, 1898, *Clausilia* (*Garnieria*) = *Tropidauchenia* (*Neniauchenia*) *rugifera* (Möllendorff, 1898) (lectotype SMF 32015, Laos: Boloven);
sajoi Szekeres, 1969, *Indonenia* = *Tropidauchenia* (*Grandinenia*) *ardouiniana* (Heude, 1885) (paratype SMF 195110, Vietnam: Lo-man);
schomburgi Schmacker & Boettger, 1890, *Clausilia* (*Garnieria*) = *Tropidauchenia* (*Grandinenia*) *schomburgi* (Schmacker & Boettger, 1890) (lectotype SMF 32026, South China: interior of Hainan);
tuba Hanley, 1868, *Clausilia* = *Tropidauchenia* (*Indonenia*) *tuba* (Hanley, 1868) (no type or original material examined).

4.4. Notes

Note 1

Tropidauchenia = *Indonenia* sensu EHRMANN was subdivided by this author (1927: 36) into two groups, *Indonenia* sensu stricto and *Symptychia* with two subgroups, *Tropidauchenia* and *Symptychia* sensu stricto. This subdivision cannot be maintained. *Indonenia* sensu stricto contains three groups which differ considerably (see Tab. 1) and may represent different phylogenetic states respectively lineages. The basal group from Laos in which both lower palatal plicae are present is described as *T.* (*Neniauchenia*) n. subgen. Both other groups in which the anterior

lower palatal plica is reduced are geographically separated; they are regarded as independent phylogenetic lineages. The group from Burma has to be named *T.* (*Indonenia*) because the type species of *Indonenia*, *T. masoni*, belongs to this group. For the group from coastal Tonkin and South China the name *T.* (*Grandinenia*) is used (see note 2).

Note **2**

The name *Grandinenia* was proposed by MINATO & CHEN (1984) for *Steatonenia mirifica* Chen & Gao from Guangxi because of its extraordinary shell shape. This species, however, is closely related to *Tropidauchenia fuchsi* from the same region with which it corresponds in all characters of major importance such as sculpture, neck formation and the development of lamellae, plicae and clausilium plate. Therefore, the peculiar shell shape is not considered as a character important enough to separate *T. mirifica* in a subgenus or even genus of its own.

Note **3**

Indonenia sajoi Szekeres (1969: 316) was founded on a local form of *Tropidauchenia ardouiniana* from Lo Man (paratype SMF 195110). This form is represented in the Senckenberg collection in some samples (SMF 199055, 209324) the examination of which has shown that it does not differ from other *T. ardouiniana* forms by any essential character. The statement of SZEKERES that the superior lamella is not connected with the spiral lamella is wrong.

Note **4**

The separation of Tonkinese *Tropidauchenia* species with fused superior and inferior lamellae as a subgroup *Symptychia* as proposed by EHRMANN (1927: 35) is not accepted. *Symptychia* is heterogenous what concerns the other characters of the clausiliar; therefore it is assumed that the fusion of the lamellae has occurred more than once. *T. demangei* differs from the other known species of *Symptychia* in the development of the lamellae (spiral lamella distant from the united inferior and superior lamellae) and the lunellar and clausilium plate (lunella strongly arched; clausilium plate very broad). *T. fischeri* n. sp. corresponds in the development of the lamellae with *T. demangei*, but in the characters of the lunellar and clausilium plate with the other species of *Symptychia*. Therefore, *T. demangei* is not separated as an independent subgenus.

Note **5**

Tropidauchenia messageri was separated as an independent species from *T. orientalis* by BAVAY & DAUTZENBERG (1899a: 47) although it differs from this species only by the shell shape and the intensity of streaking and colour. Therefore, it is evaluated as a subspecies of *T. orientalis*. *T. o. orientalis* was collected in Than Moi and Phu quoc Oai, *T. o. messageri* between Lang Son and That Khé and in Lang Phai and Hik Mon (MNHN, SMF). Thus, the ranges of both may be allopatric.

5. Descriptions of new taxa

5.1. *Garnieria mouhoti moellendorffi* n. ssp. (Fig. 2)

Holotype (SMF 32039a MÖLLENDORFF coll.): Laos, Luang Prabang.

Paratypes (SMF 32039b/5 MÖLLENDORFF coll., 32041/2 KOBELT coll., 32042/3 O. BOETTGER coll.): With the same data.

Further material of the MÖLLENDORFF coll. ex RÖBELEN from Luang Prabang or only "Laos" (SMF 32040/96, 32043/238).

Etymology: Named after O. VON MÖLLENDORFF, who recognized this new subspecies on a label as different from the nominate form.

Diagnosis: Differs from the nominate subspecies by the smaller entire shell with brighter colour and the development of the neck (basal keel stronger), the lamellae (spiral lamella more distant from the lamella inserta) and plicae (anterior upper palatal plica occasionally present).

Description: Shell entire, with conical or somewhat attenuated apical part; varying from greyish reddish-brown to nearly white; teleoconch whorls densely rib-striated (R_2: 11–16), especially on the lower whorls with spiral striae which cross and thereby undulate the riblets, sculpture on the neck scarcely coarser, at the suture groups of distinct white riblets alternating with weaker ones without white layer, groups of white riblets ± continued downwards to irregular white patches; neck with distinct basal keel and furrow, and with distinct subsutural swelling; aperture semiapostrophic (cf. NORDSIECK 1978: note 2, fig. 2), protruding, oval-piriform, yellowish to brownish in the interior, peristome expanded; superior lamella high in front, oblique, bent inwards and much lowered, lamella inserta low, separated from or connected with superior lamella, spiral lamella distant from lamella inserta, separated from superior lamella, not continued in front; inferior lamella near to superior lamella respectively lamella inserta, not steeply ascending, low in the interior and turned up, forked in front, with additional fold below, thus looking like tripartite, additional fold sometimes weakened; subcolumellar lamella steeply ascending, emerging to the peristome, indented by the adjacent clausilium plate, thereby not visible inwards; lunellar dorsolaterally situated, occasionally nearly laterally, principal plica ending nearly laterally or laterally, in front not continued into the sinulus; upper palatal plica continuous with lunella, lunella long, somewhat arched, continued by the posterior lower palatal plica by an obtuse or nearly straight angle, anterior lower palatal plica varying from short and distinct to nearly missing, if present, continuing the lunella; occasionally an anterior upper palatal plica present, but only its posterior part developed, separated from the (posterior) upper palatal plica respectively lunella and running parallel to the principal plica; palatal edge of the clausilium plate extended up to the inferior lamella, so the plate looking like doubled on itself. Spiral lamella ending dorsolaterally in the interior, at the end running together with the lamella inserta, inferior lamella penetrating to the penultimate whorl near to the insertion point of the clausilium (one specimen examined).

Measurements: Holotype: H = 35.7 mm, W = 8.3 mm, W/H = 0.231, H_A = 8.64 mm, W_A = 7.84 mm; whorls 10. – Paratypes (n = 10): H: 35.2–39.1 mm, W: 7.65–8.85 mm; whorls 10–11. – Further material (SMF 32040, n = 30): H: 31.6–39.2 mm, W: 7.6–8.8 mm.

Remarks: The original material of *Clausilia mouhoti* (L. PFEIFFER 1862: 275, pl. 36 fig. 5) from the „Lao mountains, Camboja" [BM(NH) 20010206] consists of

three specimens from which the largest one (Fig. 1; H = 41.8 mm, W = 9.1 mm) which obviously was figured by PFEIFFER is selected as lectotype. The shells are entire, but two (including the lectotype) have prepared decollation. *Clausilia massiei* Morlet (MORLET 1892: 318, pl. 7 fig. 3) from Luang Prabang the type of which [MNHN; H (decollated) = 41.9 mm, W = 9.15 mm] could also be examined belongs to the same form as *C. mouhoti*. Therefore this form which is represented in some samples in MNHN (e. g. in the MESSAGER collection) has to be named *G. m. mouhoti*.
The description of *G. mouhoti* by EHRMANN (1927: 33) refers to the new subspecies. The special aperture formation (semiapostrophy) was not considered by this author. What concerns the clausiliar, his description must be completed. The „lamella superior interna" of EHRMANN is the lamella inserta. His statement that „echte Gaumenfalten" are missing is not correct because all palatal plicae are present (see description). The specimen figured by ZILCH (1960: 402, fig. 1439) as representative of *G. mouhoti* is a paratype of *G. m. moellendorffi* n. ssp.
For both subspecies on the labels the locality Luang Prabang is given. If they are really subspecies of the same species it is clear that they do not occur at the same place. Thus, until now the exact localities of both subspecies in the region of Luang Prabang are unknown.
After the completion of the manuscript I found a sample of *G. mouhoti* in the collection of R. BRANDT (SMF) which was collected in a rain-forest near to Ban Huai Tong west of Luang Prabang. The specimens (n = 4) agree with *G. m. mouhoti* but are smaller (H: 28.1–30 mm, W: 7.3–8 mm) and without exception decollated (whorls $6^3/_4$–8). The rib-striation is somewhat more dense (R_2: $14^1/_2$–17) than that of the type form (R_2: $10^1/_2$–13).

5.2. *Garnieria saurini* **n. sp.** (Fig. 3)

Holotype (MNHN): Laos, Pah Xieng Tong, Pah Hia, SAURIN leg. (as to the location of Pah Hia see SAURIN 1953: 113).

Etymology: Named in honour of E. SAURIN who collected this and several other new clausiliid species in Laos.

Diagnosis: A *Garnieria* species with non-detached aperture and deeply situated lunellar with a short lunella.

Description: Shell decollated, apical part somewhat attenuated; probably (specimen much worn) yellowish reddish-brown; remaining whorls ribbed, on the lower whorls more irregularly (R_2: $9^1/_2$), with a distinct spiral sculpture, on the neck more coarsely ribbed; neck inflated, with weak basal keel and subsutural swelling; aperture rhombic-oval, not detached, adjacent on the parietal side, peristome much expanded; superior lamella high, connected with the lamella inserta, inwards much lowered, separated from the spiral lamella, the latter not continued in front; inferior lamella receding, relatively low, in the interior turned up, in front forked, upper branch simple, lower one forming a strong barrier; subcolumellar lamella in a perpendicular view in the aperture visible, but in an oblique view not far inwards; lunellar nearly laterally situated, in an oblique view in the aperture not visible, principal plica ending laterally; upper palatal plica continuous with the lunella by a curve, lunella short, basally broad, continued by the posterior lower palatal plica in a straight angle; clausilium plate unknown (because lost). Spiral

lamella ending laterally in the interior, inferior lamella at the beginning of the body whorl.

Measurements: Holotype: H (decollated) = 25.1 mm, W = 6.8 mm, H_A = 7,05 mm, W_A = 6.2 mm; (remaining) whorls $6^2/_3$.

Remarks: In addition to the differences specified in the diagnosis *G. saurini* n. sp. is smaller than *G. mouhoti*, it is decollated (*G. mouhoti* has a decollated or entire shell), and the sculpture is stronger. Because of the non-detached aperture the semi-apostrophy is not recognizable. The barrier at the anterior end of the inferior lamella may have originated by the fusion of the two lower branches which are present in *G. mouhoti*. The clausilium plate may also be different, as can be concluded from the differences in the development of the lunellar.

5.3. Tropidaucheniini **n. trib.**

Diagnosis: In comparison with the Garnieriini shell apostrophic (cf. Nordsieck 1978, note 2, fig. 3); superior lamella continuous with spiral lamella (or spiral lamella running on the side of the fused superior and inferior lamellae), without lamella inserta; inferior lamella and clausilium plate normally developed (not transformed as in *Garnieria*, see Tab. 1).

5.4. *Tropidauchenia (Neniauchenia)* **n. subgen.**

Type species: *Clausilia rugifera* Möllendorff, 1898.

Etymology: Combined from Neniinae and *Tropidauchenia* because of the similarity of the species of the subgenus with certain Neniinae species.

Diagnosis: In comparison with the other *Tropidauchenia* subgenera characterized as follows: Inferior lamella ± distant from superior and spiral lamella; anterior and posterior lower palatal plicae present, posterior lower palatal plica continuing anterior one, both occasionally separated from lunella; clausilium plate normally developed (relatively narrow).

5.5. *Tropidauchenia (Neniauchenia) amoena* **n. sp.** (Fig. 4)

Holotype (MNHN): Laos, Phou Tiou, Saurin leg.
Paratypes (MNHN/6): With the same data; (MNHN/4): Laos, Ban Peng, Saurin leg.

Etymology: Named for its handsome appearance.

Diagnosis: A small *Tropidauchenia* (*Neniauchenia*) species with a coarse sculpture without ridges and a lunella which is connected with the lower palatal plicae.

Description: Shell with short conical apical part; yellowish reddish-brown; teleoconch whorls coarsely ribbed (R_2: 7–9), riblets on the neck more narrowly spaced, irregular and undulate; neck with weak basal keel and furrow, flattened, ± with subsutural swelling; aperture much descending, rounded-oval; superior lamella high, continuous with the lower spiral lamella by a curve; inferior lamella distant from the superior respectively spiral lamella, S-like ascending, inwards ± high, in front ending on the columellar edge (occasionally with a thickening); subcolumellar lamella in a perpendicular view in the aperture visible and in an oblique view ± far

inwards; lunellar dorsolaterally or more dorsally situated, principal plica ending dorsolaterally; upper palatal plica short, continuous with the straight lunella, both lower palatal plicae present, connected with the lunella, anterior lower palatal plica of different length, posterior one continuing the anterior one, shorter (in one specimen subclaustralis and sulcalis discernible); clausilium plate relatively narrow, distally pointed. Spiral lamella ending nearly laterally in the interior, inferior lamella more deeply than ventrally (one specimen examined).

Measurements: Holotype: H = 21.4 mm, W = 5 mm, W/H = 0.234, H_A = 4.6 mm, W_A = 4.55 mm; whorls $7^1/_4$. – Paratypes (Phou Tiou, n = 6): H: 19.7–22 mm, W: 4.5–5 mm; (Ban Peng, n = 4): H: 20.9–22.2 mm, W: 4.8–5.1 mm; whorls $7^1/_4$–$7^1/_2$.

Remarks: Nearly all shells of *T. amoena* n. sp. are worn, looking like subfossils so that it is not quite sure that the species is a Recent one.

The new species differs so much from the other members of the subgenus that a comparison which goes beyond the diagnosis is superfluous.

5.6. *Tropidauchenia (Neniauchenia) dautzenbergi decollata* **n. ssp.** (Fig. 5)

Holotype (MNHN): Laos, B. (= Ban) Na Ka Yak (Nhoum = Ngum?), SAURIN leg.
Paratypes (MNHN/1+1 fragm.): With the same data.

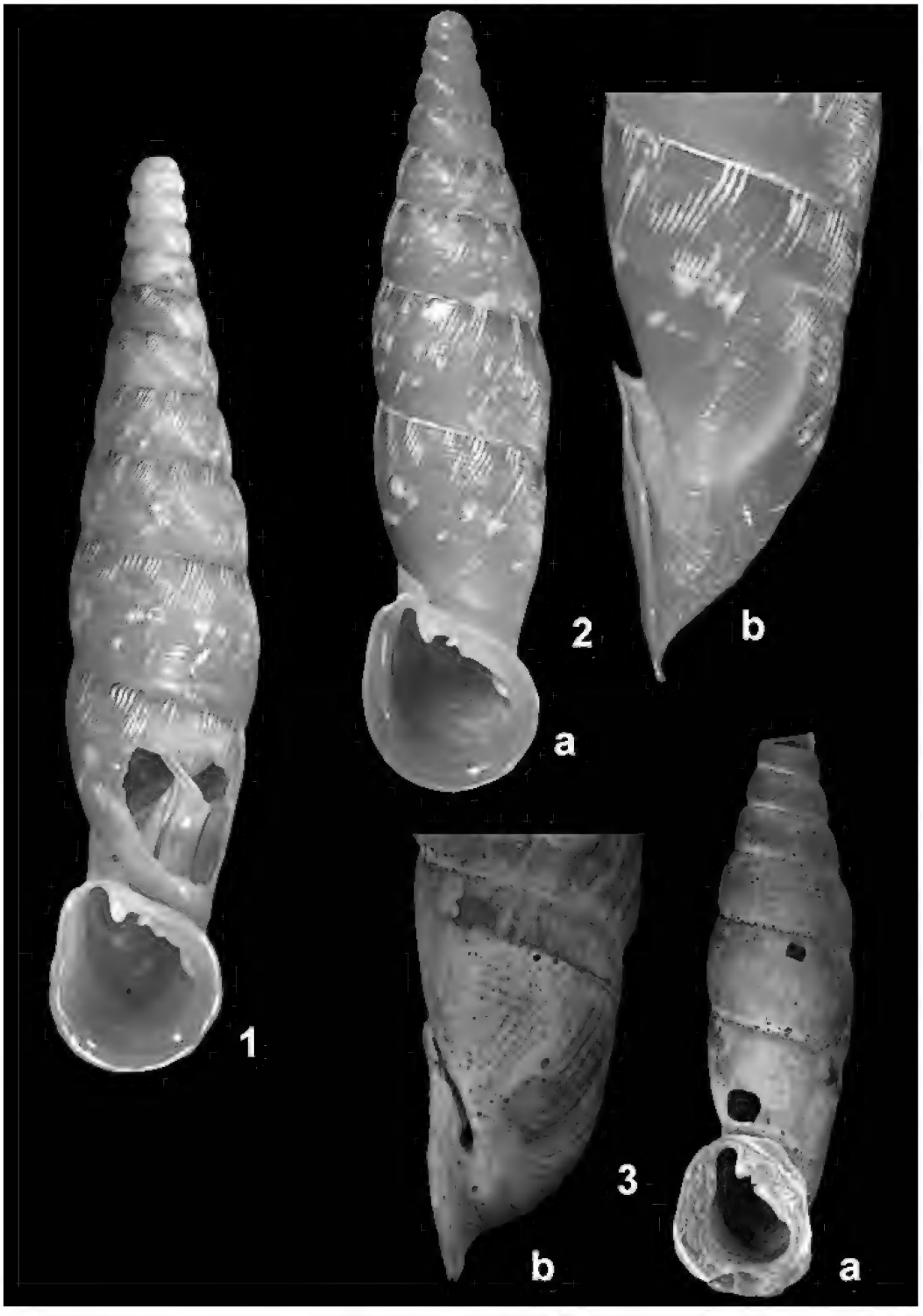
Etymology: Named for its decollated shell.

Diagnosis: Differs from the nominate subspecies by the decollation and the position of lunellar (more deeply situated, clausilium plate less visible).

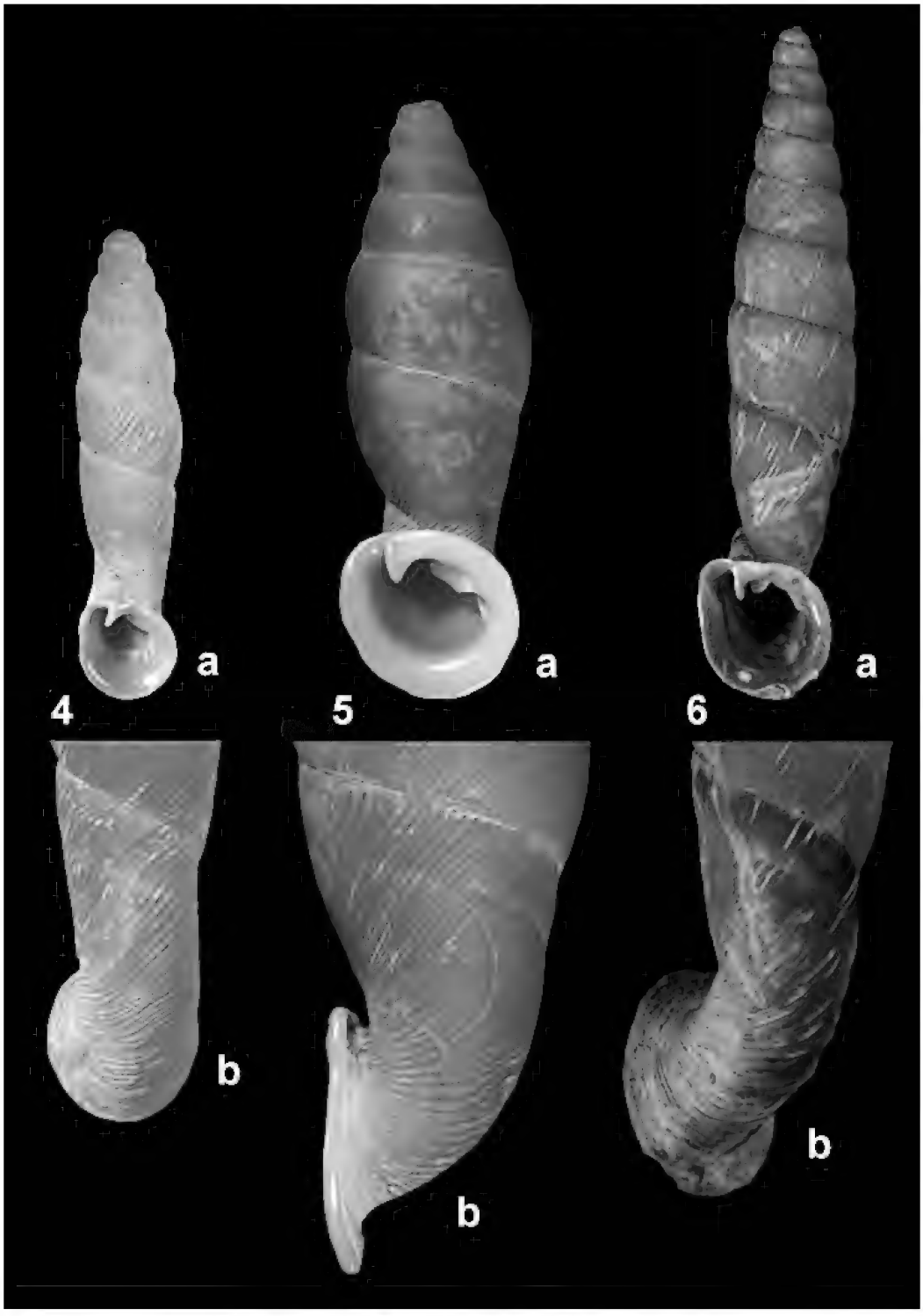
Description: Shell decollated; yellowish reddish-brown, on the upper whorls with a pale sutural zone; remaining whorls coarsely rib-striated, lower whorls somewhat more densely sculptured (R_2: $9^1/_2$, 11), on the neck rib-striae somewhat stronger and undulate; neck rounded, with weak basal keel and furrow and indistinct subsutural swelling; aperture somewhat protruding, roundish-oval or nearly rhombic, yellowish-brown in the interior, peristome expanded and ± thickened; superior lamella high, continuous with the spiral lamella by a ± distinct curve; inferior lamella distant from the superior respectively spiral lamella, obliquely ascending, inwards low or moderately high, in front with a strong elevation on the columellar edge, caused by a S-like bend; subcolumellar lamella steeply ascending, in a perpendicular view in the aperture visible, but not in an oblique view far inwards; lunellar dorsolaterally situated, principal plica ending laterally or more ventrolaterally; upper palatal plica continuous with the lunella by a wide curve, lunella mostly separated from the lower palatal plica, the latter with a differently long anterior and a short posterior part; clausilium plate relatively narrow, distally pointed, palatal edge somewhat emarginate on the anterior lower palatal plica.

Measurements: Holotype: H (decollated) = 27.3 mm, W = 8.3 mm, H_A = 7.36 mm, W_A = 7.9 mm; (remaining) whorls $6^1/_2$. – Paratype: H = 28.5 mm, W = 7.5 mm; whorls 7.

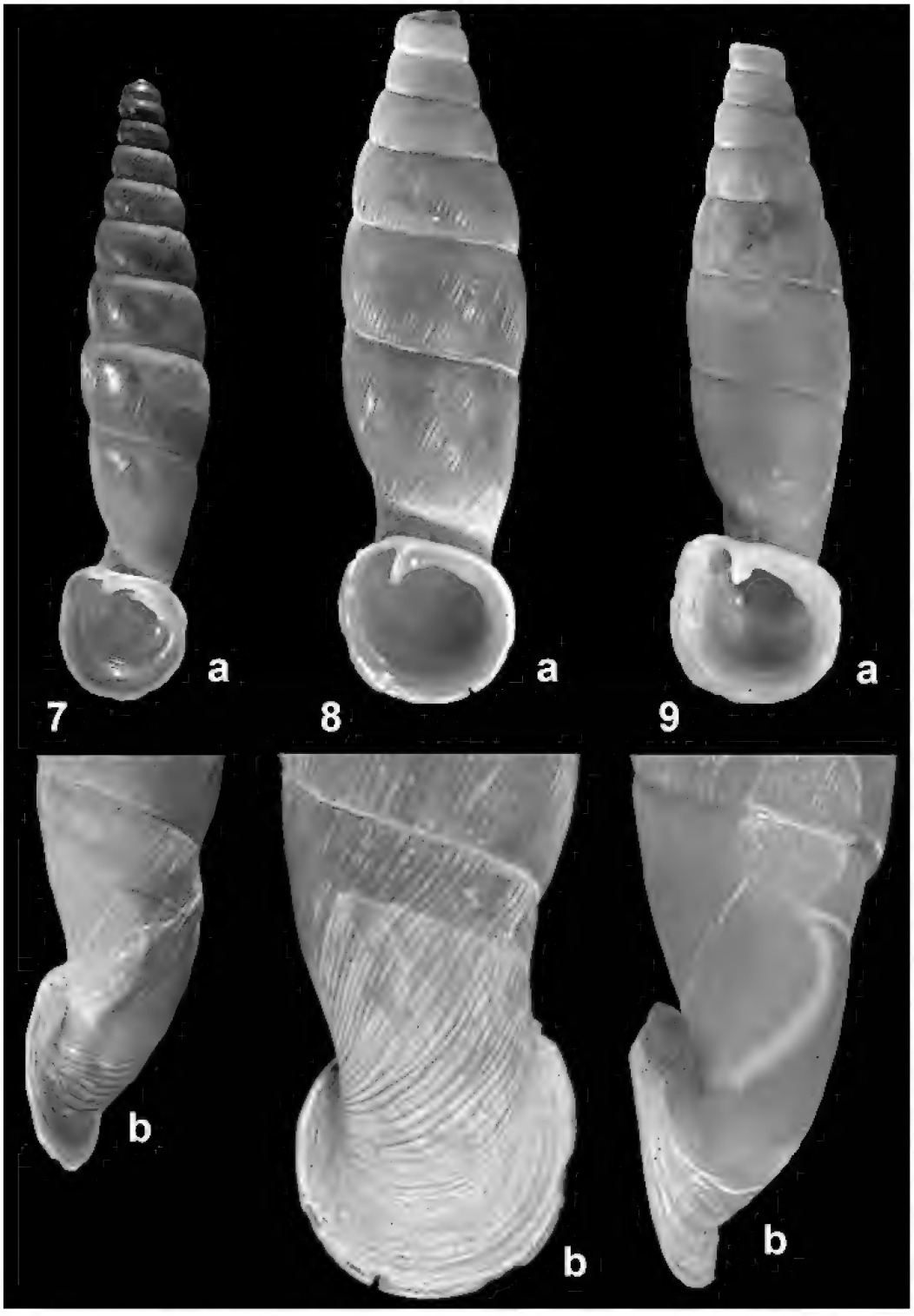
Remarks: *T. dautzenbergi* is closely related to the type species of the subgenus, *T. rugifera*, from which it differs mainly by the sculpture (only rib-striated, without ridges) and the development of the lunellar (lower palatal plica more distinct and longer). The nominate subspecies (MORLET 1892: 320, pl. 7 fig. 2) which was collected in Kham Keut has an entire shell like *T. rugifera*, and the lunellar is dorsolateral-



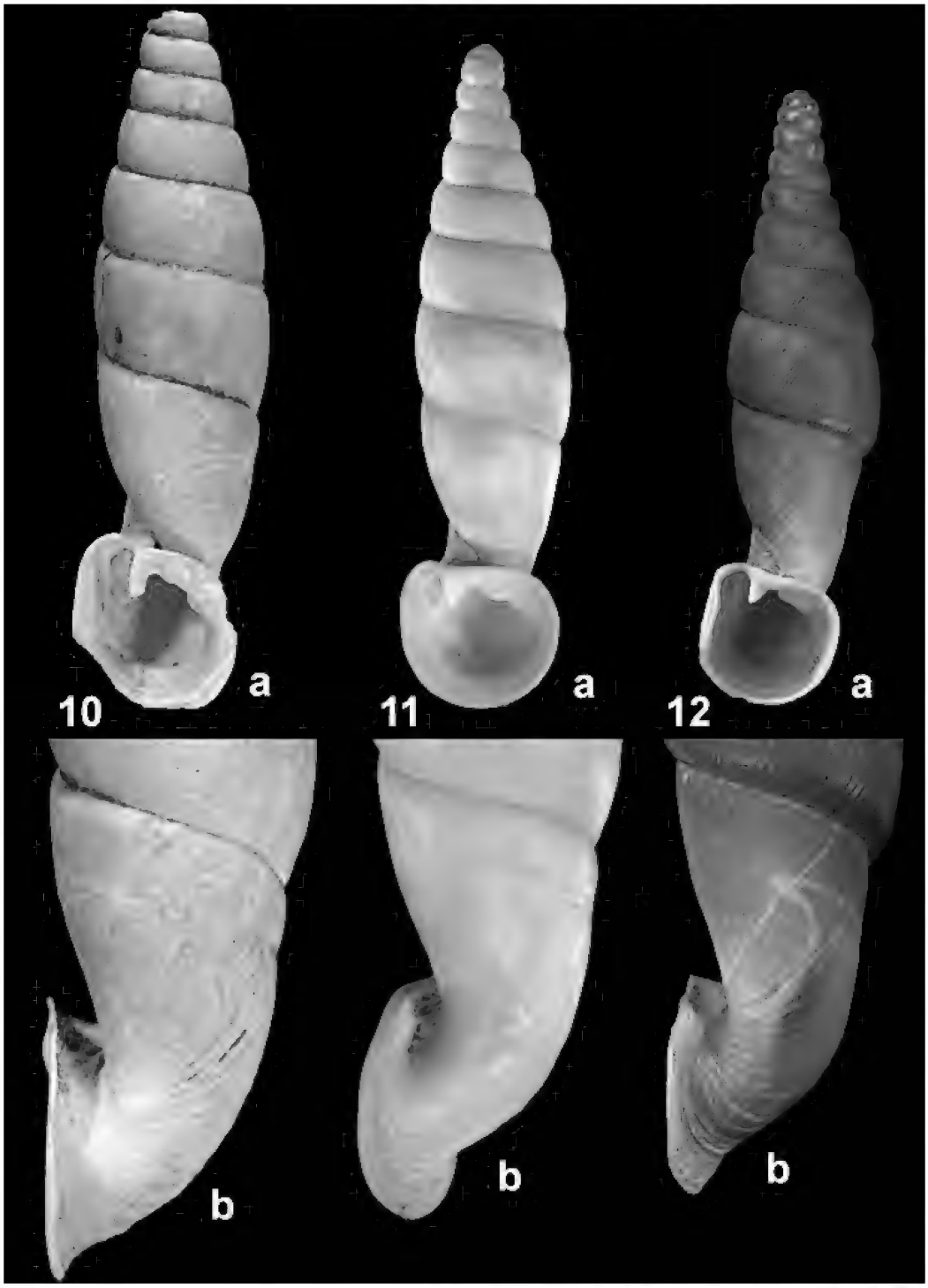
Figs. 1–3. *Garnieria* species. – 1. *Garnieria mouhoti mouhoti* (L. Pfeiffer). „Lao mountains" (lectotype BM(NH) 20010206, frontal view). – 2. *Garnieria mouhoti moellendorffi* n. ssp. Laos, Luang Prabang (holotype SMF 32039a). – a. frontal view; – b. side view of body whorl. – 3. *Garnieria saurini* n. sp. Laos, Pah Hia (holotype MNHN). – a. frontal view; – b. side view of body whorl.
Magnification: frontal view 3×, side view 5× (see also Figs. 4–12).



Figs. 4–6. *Tropidauchenia* species. – 4. *Tropidauchenia* (*Neniauchenia*) *amoena* n. sp. Laos, Phou Tiou (holotype MNHN). – a. frontal view; – b. side view of body whorl. – 5. *Tropidauchenia* (*Neniauchenia*) *dautzenbergi decollata* n. ssp. Laos, B. Na Ka Yak (Nhoum) (holotype MNHN). – a. frontal view; – b. side view of body whorl. – 6. *Tropidauchenia* (*Indonenia*) *excellens* n. sp. Burma, Carin Mts., 1200–1300 m alt. (holotype MNHN). – a. frontal view; – b. side view of body whorl.



Figs. 7–9. *Tropidauchenia* species. – 7. *Tropidauchenia* (*Grandinenia*) *cinderella* n. sp. China, Guangxi, „Moonhill" 8 km SW Yangshuo (holotype NNM 82453). – a. frontal view; – b. side view of body whorl. – 8. *Tropidauchenia* (*T.*) *donggiaoensis* n. sp. Vietnam, Gare de Dong Giao (holotype MNHN). – a. frontal view; – b. side view of body whorl. – 9. *Tropidauchenia* (*T.*) *fischeri fischeri* n. ssp. Vietnam, Chiem Hoa (holotype MNHN). – a. frontal view; – b. side view of body whorl.



Figs. 10–12. *Tropidauchenia* species. – 10. *Tropidauchenia* (*T.*) *fischeri reticulata* n. ssp. Vietnam, Gare de Dong Giao (holotype SMF 233445). – a. frontal view; – b. side view of body whorl. – 11. *Tropidauchenia* (*T.*) *giardi citrina* n. ssp. Vietnam, That Khé (holotype MNHN). – a. frontal view; – b. side view of body whorl. – 12. *Tropidauchenia* (*T.*) *giardi brunnea* n. ssp. Vietnam, voisinage des lacs Ba Bé (holotype = type de *Clausilia dorri* var. *minor* Bavay & Dautzenberg MNHN). – a. frontal view; – b. side view of body whorl.

ly or more dorsally situated. Its measurements are the following: lectotype H = 32.05 mm, W = 8.05 mm; paratype H = 28.55 mm, W = 7.55 mm; whorls $8^1/_4$, 8.
T. dautzenbergi decollata n. ssp. differs only slightly from the nominate subspecies, but the main difference, the decollation, is a character which is, as a rule, constant for subspecies or species within the Garnieriinae. When more material will be available, it should be checked if the proposed separation as subspecies is justified.

5.7. *Tropidauchenia (Indonenia) excellens* **n. sp.** (Fig. 6)

Holotype (MNHN): Burma, Carin (= Karin) Mts., 1200–1300 m alt., FEA leg. (Viaggio in Birmania 1885–1889).

Paratypes (NMW 20045/3, UF 117592/2): With the same data.

Etymology: Named for its remarkable colour and streaking patterns.

Diagnosis: A *Tropidauchenia* (*Indonenia*) species with vivid colour and rich streaking and a lunella without a basal corner.

Description: Shell with thick conical apical part, protoconch acute; yellowish greyish- or reddish-brown, neck deeper brown, lower whorls with a reddish-brown sutural band; teleoconch whorls irregularly rib-striated, some riblets stronger and white, mainly at the suture, lower whorls more densely sculptured (R_2: 16–21), groups of riblets partly white, forming axial oblique streaking zones, neck more coarsely sculptured, with more white ribs; body whorl with subsutural swelling behind and dorsal inflation in front, basal keel and furrow indistinct; aperture protruding, rounded-piriform or rhombic, orange-brown in the interior, peristome expanded, coloured mainly at the palatal side and below; superior lamella high, continuous with or contiguous to the spiral lamella, somewhat elongated by its side; inferior lamella near to the superior respectively spiral lamella, spirally ascending, high inwards, in front ending besides the superior lamella; subcolumellar lamella steeply ascending in front, in a perpendicular view in the aperture well-visible and in an oblique view far inwards; lunellar ± dorsolaterally situated, principal plica ending nearly ventrolaterally, in front continued into the sinulus; upper palatal plica short, lunella oblique above, arched below, more weakly developed in the upper part, continuous with the posterior lower palatal plica without a basal corner; clausilium plate relatively broad, distally pointed at the outer end. Spiral lamella ending dorsolaterally or laterally in the interior, inferior lamella reaching the penultimate whorl (two specimens examined).

Measurements: Holotype: H = 30.1 mm, W = 6.2 mm, W/H = 0.206, H_A = 6.25 mm, W_A = 6 mm; whorls $9^1/_2$. – Paratypes (n = 5): H: 27.5–31.6 mm, W: 5.9–6.5 mm; whorls $9^1/_4$–10.

Remarks: *T. excellens* n. sp. is closely related to *T. masoni* [syntypes BM(NH)] but differs from it by the following characters: shell less slender, with thicker apical part; with vivid colour and rich streaking; sculpture somewhat coarser; inferior lamella higher; lunella without a basal corner; clausilium plate less broad.
A comparison with the other species from Burma, *T. tuba*, was not possible because the type specimens [BM(NH)] were not traceable. The figure (HANLEY & THEOBALD 1870: pl. 24 fig. 9), parts of its diagnosis ("... albido-cornea, unicolor, ... lineis elevatis vix continuis ... oblique corrugata ...") and the measurements and whorl number of that species (cf. GUDE 1914: 330–331) speak against the specific identity of both taxa.

5.8. *Tropidauchenia (Grandinenia) cinderella* **n. sp.** (Fig. 7)

Holotype (NNM 82453): China, Guangxi, „Moonhill" 8 km SW Yangshuo, 14.X.1993, M. & R. A. LOMBAERTS leg.

Paratypes (NNM 82454/15): With the same data.

Etymology: Named for its inconspicuous appearance in comparison with the related *T. fuchsi*.

Diagnosis: A greyish-brown *Tropidauchenia* (*Grandinenia*) species with a spirally ascending inferior lamella and a lunellar with anterior lower palatal plica.

Description: Shell with conical or somewhat attenuated apical part, protoconch blunt; greyish yellowish-brown, on the body whorl more deeply coloured along the principal plica and lunella and along the suture; teleoconch whorls coarsely rib-striated, lower ones ± more densely and weakly sculptured (R_2: 13–19), on the neck rib-striae becoming somewhat undulate ribs, ribs partly white; neck rounded, basal keel and furrow ± distinct, subsutural swelling distinct; aperture protruding, rhombic- or roundish-oval, ± yellowish-brown in the interior, peristome expanded; superior lamella high, continuous with the spiral lamella by a weak curve, ± indistinctly elongated by its side; inferior lamella near to superior respectively spiral lamella, spirally ascending, ± low inwards, in front ending on the columellar edge with a thickening; subcolumellar lamella steeply ascending in front, in a perpendicular view in the aperture visible and in an oblique view far inwards; lunellar dorsolaterally situated, principal plica ending laterally, in front continued into the sinulus; upper palatal plica continuous with the straight oblique lunella by a wide curve, anterior lower palatal plica of different length, continuing the lunella, posterior lower palatal plica varying from very short to missing; clausilium plate narrow, occasionally leaving a gap at the palatal side, distally pointed and turned to the outside. Spiral lamella ending nearly dorsally in the interior, inferior lamella penetrating to the insertion point of the clausilium in the penultimate whorl (one specimen examined).

Measurements: Holotype: H = 29.1 mm, W = 6.35 mm, W/H = 0.22, H_A = 6.34 mm, W_A = 5.95 mm; whorls 10. – Paratypes (n = 15): H: 24.65–32.95 mm, W: 5.6–6.85 mm; whorls $9^1/_2$–$10^1/_2$.

Remarks: *T. cinderella* n. sp. is closely related to *T. fuchsi* (original material from Guangxi without exact locality SMF) which was recently collected in Guilin (cf. MINATO 1992). It differs from this species by the less conspicuous colour of the body whorl and the development of the lamellae (superior lamella continuous with the spiral lamella by a weaker curve; inferior lamella mostly ascending with stronger spiral), the lunellar (more deeply situated, anterior lower palatal plica present) and the clausilium plate (narrower). The differences of *T. cinderella* n. sp. and *T. fuchsi* are greater than those between subspecies within the Garnieriinae, although the localities of both are not much distant from another.

5.9. *Tropidauchenia (Tropidauchenia) donggiaoensis* **n. sp.** (Fig. 8)

Holotype (MNHN): Vietnam, Gare de Dong Giao, DEMANGE leg.

Paratypes (MNHN/7): With the same data.

Etymology: Named for its occurrence in Dong Giao.

Diagnosis: A decollated *Tropidauchenia* (*Tropidauchenia*) species with rounded

neck, non-fused superior and inferior lamellae and an oblique lunella without lower palatal plicae.

Description: Shell decollated; greyish-brown; remaining whorls coarsely rib-striated, riblets not white, on the lower whorls somewhat or scarcely more densely sculptured (R_2: 7–9), on the neck more coarsely again; neck nearly rounded, somewhat impressed behind, dorsal keel nearly missing, subsutural swelling indistinct; aperture roundish-oval, light brown in the interior, peristome much expanded; superior lamella high, continuous with the low spiral lamella by a curve, mostly elongated by its side; inferior lamella near to the superior respectively spiral lamella, in front low, ending besides the superior lamella, somewhat higher in the interior, anterior descending part indistinct; subcolumellar lamella receding, in a perpendicular view in the aperture not visible, but in an oblique view far inwards, at the anterior end somewhat higher; lunellar dorsolaterally situated (nearly dorsally above, nearly laterally below), principal plica ending dorsolaterally or laterally, in front continued into the sinulus; upper palatal plica short, occasionally peculiarly doubled, continuous with the straight oblique lunella by a wide curve, lunella fairly descending, anterior lower palatal plica absent, posterior one indistinct or absent; clausilium plate relatively broad, palatal edge projecting over the upper part of the lunella, distally pointed.

Measurements: Holotype: H (decollated) = 32.6 mm, W = 8.9 mm, H_A = 8.3 mm, W_A = 8.1 mm; (remaining) whorls $6^1/_2$. – Paratypes (n = 7): H: 29.9–34.9 mm, W: 8.4–9.2 mm; whorls $5^1/_2$–$7^3/_4$.

Remarks: *T. donggiaoensis* n. sp. differs from *T. dorri* with which it was wrongly identified by the following characters: Shell not streaked; sculpture coarser, neck sculpture regular on the whole body whorl; neck rounded; anterior lower palatal plica absent, posterior one indistinct or absent.

The new species is more closely related to *T. proctostoma* with which it corresponds in the neck formation and the development of the lunellar. The differences from this species concern mainly the size (smaller and more slender), the development of the inferior lamella (partly lower) and the clausilium plate (distal part less narrowed).

5.10. *Tropidauchenia (Tropidauchenia) fischeri* **n. sp.** (Fig. 9)

Holotype (MNHN): Vietnam, Chiem Hoa, collector unknown.

Etymology: Named in honour of H. Fischer who described, in part with Ph. Dautzenberg, several new Tonkinese land snail species (cf. H. Fischer 1898, Dautzenberg & Fischer 1908).

Diagnosis: A decollated *Tropidauchenia* (*Tropidauchenia*) species with fused superior and inferior lamellae and a lunellar with both lower palatal plicae, the anterior one rudimentary.

Description: Shell decollated; yellowish reddish-brown, with an indistinct darker band along principal plica and lunella, without streaking; remaining whorls rib-striated, somewhat more densely on the lower whorls (R_2: 15), on the neck more coarsely; neck somewhat compressed, rounded with a dorsal inflation, basal keel and furrow indistinct, subsutural swelling more distinct; aperture roundish-oval, yellowish reddish-brown in the interior, peristome much expanded; superior lamella high, fused with the inferior lamella with only a slight lowering, spiral lamella dis-

tant from the united lamellae, low, in front approaching the superior lamella from the side; rudiment of the anterior descending part of the inferior lamella nearly missing; subcolumellar lamella in a perpendicular view in the aperture visible and in an oblique view far inwards; lunellar dorsolaterally situated (nearly dorsally above, nearly laterally below), principal plica ending nearly laterally, in front scarcely continued into the sinulus; upper palatal plica short, continuous with the straight oblique lunella by a curve, both lower palatal plicae present, connected with the lunella, anterior one rudimentary, posterior one short; clausilium plate moderately broad, distally pointed.

Measurements: Holotype: H (decollated) = 31 mm, W = 7.9 mm, H_A = 8 mm, W_A = 7.8 mm; (remaining) whorls $7^1/_4$ (counted from the decollation closure $6^1/_2$).

Remarks: *T. fischeri* n. sp. is similar to *T. giardi* on the one hand and to *T. dorri* on the other.

T. fischeri n. sp. has fused lamellae like *T. giardi* but differs from this species by the following characters: Shell decollated; spiral lamella distant from the united superior and inferior lamellae, together with the principal plica more receding; rudiment of the anterior descending part of the inferior lamella missing; lunellar less deeply situated; anterior lower palatal plica rudimentary, posterior one connected with the lunella; clausilium plate broader.

T. dorri has non-fused lamellae and differs moreover by its streaking, spiral lamella and principal plica less receding, posterior lower palatal plica, if present, ± separated from the lunella.

The form of *T. fischeri* characterized above represents the nominate subspecies because the form which is described in the following is evaluated as a new subspecies of *T. fischeri*.

5.11. *Tropidauchenia (Tropidauchenia) fischeri reticulata* **n. ssp.**
(Fig. 10)

Holotype (SMF 233445): Vietnam, Gare de Dong Giao, 98.11 (= 11. 1898?), Dabbert leg.

Etymology: Named for its characteristic reticulate sculpture.

Diagnosis: Differs from the nominate subspecies by the sculpture (more densely rib-striated, with spiral sculpture) and the development of the principal plica (less receding), lunellar (without rudiment of anterior lower palatal plica) and clausilium plate (broader).

Description: Shell decollated; probably (because worn) yellowish greyish-brown; remaining whorls densely rib-striated, on the lower whorls rib-striae crossed by a spiral sculpture (R_2: 19), on the neck more coarsely sculptured; neck rounded, with dorsal inflation, basal keel and furrow indistinct, subsutural swelling more distinct; aperture rhombic-oval, peristome expanded; superior lamella high, fused with the somewhat lower inferior lamella, spiral lamella distant from the united lamellae, low, in front approaching the superior lamella from the side; rudiment of the anterior descending part of the inferior lamella present; subcolumellar lamella in a perpendicular view in the aperture visible and in an oblique view far inwards; lunellar dorsolaterally situated (nearly dorsally above, laterally below), principal plica ending laterally, in front continued into the sinulus; upper palatal plica continuous with the straight lunella by a curve, lunella with a basal corner, connected with

the short posterior lower palatal plica; clausilium plate relatively broad, upper palatal edge projecting over the lunella, distally much narrowed and pointed.

Measurements: Holotype: H (decollated) = 31.6 mm, W = 8.5 mm, H_A = 8.1 mm, W_A = 7.4 mm; (remaining) whorls 7.

Remarks: After the completion of the manuscript I found in the MNHN collection a sample of *T. f. reticulata* without indication of locality. The specimens (n = 3) are in better condition than the holotype. Some characters are as follows: Shell yellowish greyish-brown or yellowish reddish-brown, cream-coloured in the aperture; whorls densely rib-striated (R_2: 21–23); neck with pronounced dorsal inflation; rudiment of the anterior descending part of the inferior lamella nearly or totally missing; anterior lower palatal plica rudimentary or missing, posterior one short and weakly developed, ± connected with the lunella. Measurements: H: 28.7–29.3 mm, W: 7.5–7.7 mm; (remaining) whorls $6^1/_2$–7.

5.12. *Tropidauchenia (Tropidauchenia) giardi citrina* **n. ssp.** (Fig. 11)

1899 *Clausilia* (*Pseudonenia*) *giardi*, – Bavay & Dautzenberg, J. Conch., **47** (1): 50, pl. 3, fig. 2, 2a.

Holotype (MNHN): Vietnam, That Khé, Messager leg.

Paratypes (MNHN/4, SMF 233446/3): With the same data; – (MNHN/20): Vietnam, between Lang Son and That Khé, Messager leg.; – (MNHN/6, SMF 32030/5, 233448/3): Vietnam, Lang Son, Messager leg.

Etymology: Named for its characteristic shell colour.

Diagnosis: Differs from the nominate subspecies by the size (smaller), shape (apical part more attenuated) and colour (yellowish-white, darker zones indistinct); sculpture (coarser); development of subcolumellar lamella (higher at the anterior end) and position of lunellar (less deeply situated).

Description: Shell with ± attenuated apical part; yellowish-white (or yellowish-grey), darker zones behind aperture and along principal plica and lunella ± indistinct; teleoconch whorls regularly rib-striated, sculpture on the lower whorls not or scarcely weaker (R_2: $9^1/_2$–14), on the neck coarser but shallower; neck compressed, rounded, basal keel and furrow and subsutural swelling indistinct; aperture rounded-oval or rhombic, peristome much expanded; superior lamella high, fused with the inferior lamella with only a slight lowering, spiral lamella near to the united superior and inferior lamellae, in front running on the side of the superior lamella; rudiment of the anterior descending part of the inferior lamella well-developed, separated from the inferior lamella by a depression; subcolumellar lamella in a perpendicular view in the aperture visible or not, somewhat higher at the anterior end, in an oblique view visible far inwards; lunellar dorsolaterally or more laterally situated, principal plica ending nearly laterally or laterally, in front continued into the sinulus; upper palatal plica continuous with the more or less perpendicular lunella by a curve, anterior lower palatal plica ± short, continuing the lunella, posterior one reduced, if present, ± separated from the lunella; clausilium plate narrow, palatal edge in part projecting over the lunella, distally pointed, partly with an outer corner.

Measurements: Holotype: H = 30.1 mm, W = 7.4 mm, W/H = 0.246, H_A = 6.8 mm, W_A = 7.25 mm; whorls 10. – Paratypes (between Lang Son and That Khé, n = 20): H: 28.6–33.9 mm, W: 7.3–8.1 mm; whorls $9^1/_2$–$10^3/_4$.

Remarks: See *Tropidauchenia* (*T.*) *giardi brunnea* n. ssp.

5.13. *Tropidauchenia (Tropidauchenia) giardi brunnea* **n. ssp.** (Fig. 12)

1899 *Clausilia* (*Pseudonenia*) *dorri* var. γ. *minor* Bavay & Dautzenberg, J. Conch., **47** (4): 283 [non Rossmässler, 1836].

Holotype (= lectotype of *Clausilia dorri* var. *minor*, MNHN): Vietnam, voisinage des lacs Ba Bé, MESSAGER leg.

Paratypes (MNHN/10): With the same data; (SMF 30033/1): Vietnam, Lang Phai, collector unknown.

Etymology: See *T. g. citrina* n. ssp.

Diagnosis: Differs from the nominate subspecies by the same characters as *T. g. citrina* n. ssp. but is smaller and more ventricose than this subspecies; yellowish reddish-brown, ± more deeply coloured behind the aperture and along the principal plica and lunella; upper whorls more convex; subsutural swelling of the neck stronger; subcolumellar lamella more receding (in a perpendicular view in the aperture never visible).

Description: Other characters like *T. g. citrina* n. ssp. R_2: $9^1/_2$–14.

Measurements: Holotype: H = 27.55 mm, W = 7.05 mm, W/H = 0.256, H_A = 6.15 mm, W_A = 6.15 mm; whorls $9^3/_4$. – Paratypes (voisinage des lacs Ba Bé, n = 10): H: 24.4–29.4 mm, W: 6.8–7.3 mm; whorls $9^1/_4$–10.

Remarks: The nominate subspecies of *T. giardi* (syntype and other original material MNHN) is characterized as follows: Shell relatively large (H: 31–37 mm); yellowish-grey, with brown sutural band on the lower whorls and brown zones on the body whorl behind the aperture and along the principal plica and lunella; lower whorls densely rib-striated (R_2: 12–17); subcolumellar lamella not higher at the anterior end; lunellar nearly laterally or laterally situated.

As the examination of the type material (MNHN) has shown, *Clausilia dorri* sensu BAVAY & DAUTZENBERG (1899: 283–285) comprises three species, *T. dorri* (typ. and var. β. *elongata*), *T. bavayi* (var. δ. *cristata*) and *T. giardi brunnea* n. ssp. (var. γ. *minor*). In the material of the MESSAGER collection (MNHN) two forms are determined as *C. dorri* var. *minor*, *T. giardi brunnea* n. ssp. and a small, more vividly coloured form of *T. dorri*, both often in mixed samples.

The nominate subspecies of *T. giardi* was collected by BILLET in Déo Ma Phuc (type locality, H. FISCHER 1898: 14; syntype MNHN) and by MANSUY in Quang Huyen (DAUTZENBERG & FISCHER 1908: 187; MNHN). The examined samples of *T. g. citrina* n. ssp. were collected by MESSAGER between Lang Son and That Khé (BAVAY & DAUTZENBERG 1899: 50); the localities indicated on the labels are That Khé, Lang Son, Lang Phai and Bac Kan (MNHN, SMF). The bulk of the material of *T. giardi* in the MNHN and other collections belongs to this subspecies. *T. g. brunnea* n. ssp. is part of the material which was collected by MESSAGER in the surroundings of the Ba Bé lakes (BAVAY & DAUTZENBERG 1899: 285); therefore the locality of a paratype of this subspecies Lang Phai may be wrong. If this is the case, the three subspecies are distributed in different parts of north-eastern Tonkin, which means that they have allopatric ranges.

T. g. citrina n. ssp. was collected at the same localities as *T. orientalis messageri*, *T. g. brunnea* n. ssp. in the same region as *T. dorri* and *T. bavayi*. Nothing is known of the exact distribution patterns and the ecological differences of all these species.

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